Clinical Guideline

⚠ This guideline should not replace clinical judgment.

Community Acquired Pneumonia (CAP)

Pediatric Emergency & Hospital Medicine

Inclusion criteria:

- Suspected CAP in patients > 90 days old (up to 18 years)

Exclusion Criteria:

- History of immunodeficiency (e.g. HIV, SCID, etc)
- Known lung disease (other than asthma, e.g. BPD, CF)
- Neuromuscular disease
- Prior or current trach/ventilator dependence
- Congenital heart disease
- Sickle cell disease
- Hospital acquired or institutional acquired pneumonia (e.g. any antibiotic in the last 90 days or a resident of a long-term care facility)
- Complicated pneumonia (with pleural effusion, empyema, or lung abscess) - will go off pathway

Definition of Fully-Immunized:

- ≥ 3 months and received age-appropriate immunizations

Definition of Complicated Pneumonia:

- CAP with pleural effusion or empyema

*If starting levofloxacin, obtain EKG if with:

1. Personal h/o (unexplained) syncope
2. Family h/o sudden cardiac death
3. Concurrent QTc prolonging medications
4. Known h/o hypokalemia or hypomagnesemia

Categorizing Severity of Illness	MILD (must meet ALL criteria below)	MODERATE (meets ANY of the criteria below)	SEVERE (meets ANY of the criteria below)
Oxygenation	Oxygen Saturation ≥90% on room air	Oxygen saturation persistently <90% on room air	Oxygen saturation ≤90% despite supplemental oxygen on 50% FiO2; apnea, bradypnea, or hypercarbia
Work of Breathing	None or minimal (i.e. no grunting, flaring, retractions, apnea)	Increased/moderate respiratory distress (i.e. grunting, retractions, nasal flaring)	Need for mechanical ventilation or non-invasive positive pressure ventilation; severe respiratory distress or concern for impending respiratory failure
Hydration	Able to tolerate fluids and medication by mouth	Signs of dehydration; persistent vomiting; inability to take oral medications	Systemic signs of inadequate perfusion, including fluid refractory shock, hypotension, sustained tachycardia, need for pharmacologic support of blood pressure or perfusion
Appearance	Not significantly ill or toxic appearing	Ill-appearing	Toxic or septic appearing and/or altered mental status

From the AAP Section on Emergency Medicine Committee on Quality Transformation Clinical Algorithm for Emergency Management Evaluation and Management of Pediatric Community Acquired Pneumonia

Children's Hospital of Richmond at VCU

For questions concerning this guideline, contact:
chorclinicalguidelines@vcuhealth.org

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ED phase

Clinical exam suggestive of CAP

Respiratory assessment

Mild

- CBC and blood culture not indicated
- Consider CXR if uncertain of diagnosis
- Consider RPP if uncertain of viral or bacterial pneumonia
- If suspect COVID-19, use specific COVID-19 test

Mild Treatment

- Oral antibiotics for 7 days
  - Fully immunized: amoxicillin
  - <6 month or not completed primary series: Augmentin
  - Non-severe penicillin allergy: Cefdinir
  - Severe penicillin allergy: levofloxacin*
  - If suspect CA-MRSA, add clindamycin
- Add Azithromycin for concern for atypical pneumonia (Mycoplasma, Chlamydia, Pertussis) in child >5 yr
- If suspicious for influenza, test and treat

MEET DISCHARGE CRITERIA?

- Minimal respiratory distress
- Tolerating PO
- Caregiver support
- PMD follow up within 48-72 hours

Yes → Discharge home

No → Admit to PCDU or Acute care floor

Moderate

- CXR – PA and lateral; consider bedside US to evaluate for pleural effusion
- Consider CBC with diff, blood culture, RPP
- If suspect COVID-19, use specific COVID-19 test

Moderate Treatment

- Parenteral antibiotics:
  - Fully immunized: Ampicillin
  - < 6 m or not complete primary series: Ceftriaxone
  - Non-severe penicillin allergy: Cefdinir
  - Severe penicillin allergy: levofloxacin* (If start levofloxacin, consider consulting Pediatric Infectious Disease.)
  - If suspect CA-MRSA, add clindamycin
- Add Azithromycin for concern for atypical pneumonia (Mycoplasma, Chlamydia, Pertussis) in child >5 yr
- If suspicious for influenza, test and treat, if positive
- If pleural effusion/empyema: Vancomycin + Ceftriaxone
  Consider thoracotomy tube(s)
  AND
  Obtain pleural fluid culture, gram stain and cell count with diff

Admit to Acute care floor
If chest tube, consider stepdown unit or PICU

Severe/Sepsis

- CBC with diff, blood culture, CRP, BMP, RPP, VBG with lactate
- CXR- PA and lateral; consider formal US to evaluate for pleural effusion
- If suspect COVID-19, use specific COVID-19 test

Severe Treatment

- Parenteral antibiotics: Ceftriaxone + Vancomycin
- Add Azithromycin for atypical pneumonia (Mycoplasma, Chlamydia, Pertussis) in child >5yr
- If suspicious for influenza, test and treat, if positive
- Consider consulting Pediatric Infectious Disease and if with effusion, consider consulting Pediatric Surgery
- If pleural effusion/empyema:
  Consider thoracotomy tube(s)
  AND
  Obtain pleural fluid culture, gram stain and cell count with diff
- Respiratory support as needed – supplemental O2 to maintain O2 saturations > 90%, NIPPV or intubation with mechanical ventilation
- IV fluids for signs/symptoms of shock; pressors as needed to maintain blood pressure and perfusion

Admit to PICU

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Inpatient phase

Inpatient Admission Criteria:

- Hypoxemia <90%
- Presence of increased WOB/respiratory distress
- Tachypnea
- Lethargy
- Concern for compliance and adequate follow-up
- Signs/symptoms of severe dehydration, persistent vomiting, inability to take oral medications
- All infants 3-6 months with suspected bacterial CAP
- Signs/symptoms of shock

CDU Admission Criteria:

- Poor PO intake/mild dehydration
- Mild respiratory distress for short observation (SpO2 ≥ 90%)

Continue Antibiotics

FULLY IMMUNIZED: Ampicillin

- If with PCN allergy consider ceftriaxone
- If with severe PCN allergy consider levofloxacin*. If start levofloxacin, consult Pediatric Infectious Disease.
- If suspect CA-MRSA, add clindamycin.

UNDER IMMUNIZED: Ceftriaxone

- If with severe PCN allergy or cephalosporin allergy consider levofloxacin*. If start levofloxacin, consult Pediatric Infectious Disease.
- If suspect CA-MRSA, add clindamycin.

If with complicated pneumonia:

- Consult Pediatric Surgery/ PICU and Pediatric Infectious Disease and GO OFF pathway.

Consider RPP vs. Flu/RSV upon admission if not previously done
Do obtain RPP vs. Flu/RSV if suspect mycoplasma or flu AND:

- Start/continue azithromycin if suspect mycoplasma
- Start/continue oseltamivir if suspect influenza

- O2 as needed for O2 saturations < 90%
- IVF as needed, encourage PO
- If severe pneumonia (see chart) obtain CBC/Diff, blood culture, CXR if not yet obtained (consider in moderate pneumonia)

Clinical improvement

Clinical worsening or not improving as expected

DC criteria:

- Afebrile for >12 hours
- Oxygen saturation ≥90% on room air for at least 12 hours
- No or minimal increased WOB/respiratory distress, and well-appearing
- Tolerating PO intake and PO medications (transition to at least one PO dose of antibiotic prior to DC)
- Rx filled/sent
- Follow-up in 48-72 hours established
- No social concerns

If improving

- Repeat CXR
- Consider repeat CRP, blood culture, +/- blood gas
- Consider Chest US
- Broaden antibiotic coverage to vancomycin and ceftriaxone
- Fluid resuscitation as needed
- Consult Pediatric Infectious Disease

*** If in the CDU, refer for admission based on admission criteria ***

Consider transfer to PICU for:

- Concern for AMS
- Impending respiratory failure
- Worsening sepsis
- Maximum respiratory support with persistent hypoxia (FiO2 > 50%)
- Need for positive pressure ventilation/ higher levels of support

If with complicated pneumonia:

- Consult Pediatric Surgery/ PICU and Pediatric Infectious Disease and GO OFF pathway.

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Community Acquired Pneumonia Guideline Executive Summary

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References

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Citation

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Retrieval website: http://www.chrichmond.org/clinical-pathway-pneumonia

Example:
Children's Hospital of Richmond at VCU, Woods R, Tseng A, Donowitz J, Hanson C. Pneumonia Guideline. Available from: http://www.chrichmond.org/clinicalguideline-pneumonia